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REVIEW

Global War-Ming

There is a kind of modern war for and against global warming, inherited from the influences of Chinese Ming and Qin dynasties on European ideas at the times of Franz Unger. Hence, the War-Ming in the title of this review.

The awareness of changing climate gradually influenced women in Europe and America, who relied on experimentations in vacuum technology. This study is the first to put forward the leading roles of Habsburgian Slovenians in the process of climate change, whereas a special emphasis is placed on the research of scholars from the then Maribor district, whose early biophysics was based on vacuum experiments. The mothers from Maribor gave birth to the famous Herman Potočnik Noordung and also to Franz Unger, the pioneer of greenhouse research.

Franz Unger (1800–1870) and Gregor Mendel (1822–1884) both grew up in the Habsburgian Slavic environments, which were gradually encircled by Germanized influences.

While slowly departing from the Lamarckism of Oken and the Romanticist botanist Carl Gustav Carus (1789 Leipzig – 1869 Dresden), Unger became a precursor of Darwinism on the wheels and wings of the revolutionary ideas of the Spring of Nations, which shocked the European minds in 1848. In 1858, Unger's peer, the geologist-palaeontologist Heinrich Georg Bronn (1800 Ziegelhausen by Heidelberg – 1862 Heidelberg), who was a few months older than him, mentioned Unger's botany of single initial *Urtype* (prototype, *Urpflanze*, *Urformen*) as one to have inspired Darwin's indirect footnote citation of Unger's *Attempt of a History of the Plant World*, printed in early 1852. Darwin stated: It appears that the celebrated botanist and palaeontologist Unger published, in 1852, his belief that species undergo development and modification. After the 1852 work of the "celebrated botanist and palaeontologist" Unger, in that same footnote, Darwin added among his predecessors the Baltic palaeontologist-embryologist Heinz Christian Pander (Heinrich, Riga 1794 – Saint Petersburg 1865) and the naturalist-artist Joseph Edouard d'Alton (Dalton; 1772 Aquileia – 1840), who was Karl Marx's teacher in Bonn. Darwin liked d'Alton's research on fossil

sloths, published in the first volume of *Vergleichende Osteologie* ('Comparative osteology') in 1821. In that same footnote, Darwin even proclaimed Oken's mysticism as his forerunner, although he did not elaborate on that. Pander studied chicken embryonic development against any preformation. Darwin also added among his forerunners Aristotle, who had also studied embryonic development of chicken, although Darwin directly contradicted the Bible's creation of each species separately, as well as the timing. Moreover, Darwin's quotation of Aristotle was inaccurate because Aristotle described atomism just to refute it (Darwin, 1950 [1859]).

On 27 October 1851, Mendel arrived in Vienna to become Unger's student. Two days earlier, the anti-Semitic protégé of Metternich the priest Sebastian Brunner (1814 Vienna – 1893 Währing by Vienna), editor of the *Wiener Kirchen-Zeitun*g, started to mock poor Unger. A few weeks later, on 13 January 1852, Unger dedicated his book, which pleased Darwin and Bronn so much, to the liberal botanist Joakim Frederik Schown (1789 Copenhagen – 1852 Copenhagen), while citing their common idol Alexander Humboldt. In this book, Unger devoted his final, fifth chapter to the nearly Darwinist evolution of plants under the title 'The evolution of vegetation according to different geological periods' with final concluding chapter titles '§. 88. Lawful connection of individual floras. Sequence of the creation of plants as the development of the plant world;' '§. 89. Origins of plants, their reproduction and emergence of different types;' '§ 90. Looking into the future' (Fairbanks, 2020, p. 265; Bronn, 1858; Unger, 1854 [1852], pp. 329–349; Darwin, 1950 [1859], pp. 9, 13–14). Unger concluded his ideas of Darwinist evolutionary prototypes:

> On the other hand, however, the extinction of the archetypal forms is just as regular and shows us the remainder of the by far more extensive genera, by which great, sweeping, "pragmatic history of the earth" and with it the vegetal cover has already gone through [...] This endeavor is particularly evident in the plant world, and has brought about in particular that all our cultivated plants diverged from the original types of the species, albeit astray and therefore in a sickly way, so that we often no longer recognize them [...] In this incessant fluctuation of the formations, however, lies precisely that expression of the time—the endeavor to achieve a more solid structure on the one hand and those transitional stages on the other hand which secure the entry into the next world period. (Unger, 1854 [1852], pp. 348–349)

To prove his evolutionism based on then gradually popularized entopic arrow, Unger frequently quoted his recent research of fossilized plants in Socka by

Vojnik in his native Styria (Unger, 1854 [1852], pp. 105, 183, 266, 270, 308). Certainly, Unger concentrated on (fossilized) plants while Darwin preferred animals, but both used the Clausius-Boltzmann's arrow of time, the infamous entropy, which subsequently reshaped human and other lives over the next two centuries. Their Europe was evidently changing through speedy industrialization: therefore, the Darwinists suddenly concluded that their Earth and the whole Cosmos must have been changing too. Certainly, the conservative politicians and religious leaders did not like profound changes…

Unger's youth

The members of Unger family were among the oldest citizens in Maribor as well as in Wolfsberg (Volšperk) in Lavanttal (Labotska dolina) in the Late Middle Ages: their church records could be traced well into the 16th century in both places.

The ancestors of Franz Unger's father Josef were brewers and lectifiers (licitar makers) in Wolfsberg who also traded with the local and Styrian wine in Wolfsberg between Graz and Klagenfurt in Carinthia. As lectifiers, they knew very well the Maribor bakers Bregars (Wregers), who helped Josef Unger's marriage with Maribor-born Anna Bregar (*Wolfsberg Geburtsbuch* IV—W12_004-1; V—W12_005-1; VII—W12_009-1; Wittmann & Oberländer, 2002 [1912]). The heat of baking gingerbread, licitars, and ordinary bread in the native houses of both Franz Unger's parents profoundly influenced his ideas about climate change.

On 4 February 1800, in the parish church of Leutschach an der Weinstraße (Lučane on the Wine Road) and at their home Schlossberg (Gradišče, Schloßberg) no. 57, Josef Unger (Joseph Albert von, 7 May 1764 in Hackhofer no. 6 (Wolfsberg Ober Stadt no. 7) in Carinthia – 6 August 1827 in Gradišče no. 57 by Lučane (Leutschach)) celebrated his marriage to the widow of Knebl, Ana Marija born Wreger (Anna Josepha Kneblin, Knabel, born on 10 June 1769 in Maribor no. 78, died on 4 April 1815 Gradišče (*Leutschach Sterbebuch*, 3 folios: 363, 542, 573)).

Exactly a month after his father Joseph Albert's death, in a rather shattered financial situation, Franz Unger obtained his PhD from the Faculty of Medicine in Vienna on 6 September 1827 (Reyer, 1871, p. 15). During his

father's last sufferings in August 1827 in Vienna, Franz Unger dedicated his inaugural dissertation to his friend and sponsor of natural sciences ("*Freunde und Förderer*"), Count Ferdinand Colloredo-Mannsfeld, who certainly paid Franz Unger's expenses.

Only a year and a half after defending his dissertation, on 21 May 1829, Unger fully embraced botany with his published work *Contributions to the Special Pathology of Plants.*

Physician in Kitzbühel

Later, in 1830–1835/36, Unger worked as a district court doctor in Tyrolean Kitzbühel. He obtained that prestigious post after the intervention of his former classmate from Lyceum, Anton Sauter.

In March 1832, Unger followed Oken's Hegelian natural philosophy in journal *Flora* under Unger's own redactions. Unger's ideas, published in two parts, were so speculative that he dared to sign them only with his initials. Oken developed a whole animal world out of a simple bubble, resembling Descartes' vortices. This supposed increase of the bubbles-vortices towards the poles, however, causes the same process towards the center of the axis, and so there is a differentiation in the center of the plant magnet of what was shown to be separate and isolated in both poles. In the beginning of his second anonymous part, Unger quoted the psychiatrist Dietrich Georg Kieser's (1779 Harburg by Elbe – 1862 Jena) book about the basic anatomy of plants (*Grundzüge der Anatomie der Pflanzen*), published in 1815.

Those Unger's almost anonymous speculations, published in March 1832, were followed by his more experimental publication, signed in December 1832. Unger used the Viennese Ettingshausen's microscope with a precise screw micrometer, manufactured by Georg Simon Plössl.

In 1832, Unger and Ettingshausen speculated about Robert Brown's motion, described in 1827, but not fully understood before Einstein's calculations almost eighty years later.

Unger had repeatedly expressed his wish to be able to observe the Brownian "molecular" movements, which have been discussed so often in recent years: but Unger needed excellent instruments. In Vienna, Ettingshausen was well

known as a mathematician and physicist: for some time, he also successfully studied the natural history science and, in particular, botany itself. Therefore, Unger's desire was welcomed with the greatest enthusiasm. For his part, Unger used the fertilizing pollen of *Malva sylvestris* (common mallow, wood mallow, tree mallow, high mallow). That powdered pollen moved like small beings. Five years after Brown, on 24 September 1832, from 11 to 13 o'clock on a clear day in a sunlit hamlet, on a rooftop, Unger and Ettingshausen emerged their pollen into water. They moistened it with a little water on the slide and left uncovered for several minutes. Then they squeezed it with moderate pressure through a suitable glass plate, which was placed over it. The contents of the pollen grains mingled with water, and the emptied pollen tubes laid here and there in between. They magnified their sample under the microscope 1500-fold, and then 2000-fold.

Professor Unger discovers Gregor Mendel

Unger's Darwinism influenced his student Mendel. Unger used to be the leading botanist, geologist, palaeontologist, and Mendel's Darwinist professor of botany and cytological studies involving cell appearance and structure. Unger's and Carl Wilhelm Nägeli's (1817–1891) "law of plant growth" strikingly resembled Mendel's mathematical thinking in botany and uses of numerical ratios in biological inquiry, even if Nägeli with his cell divisions discouraged Mendel during their correspondence, and even failed to quote monk Mendel's merits.

In 1850, then self-taught Mendel, lacking a broader knowledge of scientific terms, failed the oral test, the last of the three parts of his Viennese exams, which he needed to pass to become a certified high school teacher. In August 1856, Mendel, somewhat nervous, failed his Viennese teaching examination again, also because he was questioned by his professor of morphology and systematics of phanerogamous plants Eduard Fenzl (1808–1879 Vienna), and not by Mendel's other teacher in Vienna, Franz Unger, who taught anatomy and physiology of plants.

Unger taught Mendel his novel mathematicized Pythagorean ideas. Mendel attended Unger's lectures on statistical Humboldtian tabled botany from the autumn of 1851 until the summer of 1853. Around this time, in 1852 and in 1856, Unger's biogeographical ideas of common evolutionary ancestry were

criticized in print in Vienna and across the Habsburgian monarchy: Mendel supported his teacher Unger and subsequently sent to Unger and others his hybridization paper in 1866. Both Unger and Mendel were members of the zoological-botanical society in Vienna and Brno natural science society. Moreover, they joined Marian Koller's Habsburgian meteorological statistical telegraphy projects. Just like Unger, his student Georg Mendel also loved to travel, among others onboard the second "pleasure train" (*Vergnügungszug*), which took him to Paris, to the International Exhibition in London in August 1862, and offered Mendel some unforgettable sightseeing in Stuttgart.

The law of botanist Karl Schimper represented the ideal of scientific explanation toward which Unger and Mendel strove. Fenzl denied his antagonist Unger's and Mendel's claims that fertilization might be the combination of male and female cells. Those ideas echoed the then popular ideas of feminist gender equality. Their fusion of gametes supported by the Germanized cell theory, propelled by the spleen of the Spring of Nations soon disproved Fenzel's preformationist Paracelsus' Goethean Faustian homunculus claims in favour of the good old Aristotelian epigenesis. The biological cells and genes followed their analogy from the newly revived atomic theory, all of them subordinated to the modernized dehumanized impersonal statistics.

The other teachers of Mendel in Vienna—Baumgartner, Doppler, Ettingshausen and chemist Redtenbacher—could not prevent Mendel's failure of formal education. As in Sweden, there were highly lucrative Habsburgian academic family relations: since 1867, Fenzl was the father-in-law of J. Stefan's critic, mineralogist Gustav Tschermak, and consequently the grandfather of Gustav's son, Erich von Tschermak-Seysenegg. Erich revitalized Mendel's theory: the deceased grandfather Fenzl did not protest. Nägeli's students Carl Correns (1864–1933) and Erich von Tschermak-Seysenegg published their Mendelian data in Tübingen in January 1900 and in Vienna in June 1900. Agriculturist Erich von Tschermak-Seysenegg used the help of his brother, psychologist Armin Tschermak-Seysenegg (1870–1952), to republish Mendel's paper with his own comments (Mendel, 1901 [1866]): Fenzl was no longer around to provide any further criticism to his grandson's rehabilitation of Fenzl's kicked out student. Fenzl was also the father-in-law of astronomer Edmund Weiss, who married Adelinde Fenzl. Unger and Mendel had no such relatives.

Just before the famous Mendel's papers, in 1860 and in 1865 Unger deliberately advocated the somewhat dubious *Atlantis* hypothesis to explain the likeness between the fossil flora of Europe and the modern flora in the Americas. Unger was influenced by A. Humboldt's Viennese connections.

Unger's liberal Catholic evolutionism certainly troubled his conservative Catholic compatriots in Habsburgian monarchy, where religious education was still compulsive in Cisleithania during the Concordat in 1855–1871.

Unger's climate change

Franz Unger postulated that volcanic eruptions emitted humid vapours and carbonic acid gas (CO_2). Those gave Earth the warmer conditions throughout its geologic past, which Lady Eunice Foote accepted and tried to prove in her experiments. In 1846–1849, during the Spring of Nations, the Graz based artist Josef Kuwasseg (1799–1859) illustrated Unger's masterpiece *Ideal Views of the Primitive World*, published at Unger's own expense. Kuwasseg included Unger's information on fossil plants that the latter had found at multiple locations. Kuwasseg painted there some of the earliest drawings of prehistoric animals, while Unger wrote the explanatory text based on his scientific understanding at the time. Unger postulated that volcanic eruptions emitted humid vapours and carbonic acid gas, which gave Earth the warmer conditions and the CO_2 as "food" needed for ancient plants, dinosaurs, and other early animals to thrive. Unger wrote about

> small, damp islands, covered with forests inhabited by the greatest and most terrible monsters of the ancient world: such are the scenes which this formation offers to the artist, judging from scientific researches already made. An atmosphere filled with humid vapours and exhalations of carbonic acid was as favourable to this prodigious propagation of the amphibious races, as to the development of Ferns, Cycadeae, Coniferae, and of some Monocotyledons. (Unger, 1851 [1846], Plate IX)

Unger, and many others, felt that the atmospheric water vapour was the cause of the prehistoric warmth, while the carbon dioxide provided food for the lush vegetation that subsequently gave rise to the vast coal deposits of the carboniferous (coal-bearing) period. Unger accepted old Fourier's idea of steady nature which follows the law of conservation of warmth, even if the flora of the still unindustrialized Habsburgian Empire diminished Unger's notion of man-made climate change, which was already evident in Fourier's industrialized Paris: "as soon as the protection of culture ceases, it becomes all too soon evident that the original condition is restored […] The law of dependence on heat has beyond

question made itself sensible as most influential. All plants bow to the iron sceptre of this influence." (Unger, 1854 [1852], pp. 97–98) Unger additionally still relied on the mechanical philosophy of Fourier's antagonist Laplace, who was far from the later Boltzmann-Heisenberg statistical uncertainties:

> Not an atom of them all disappears, that absolutely nothing passes away without trace […] and their fate in time. For every condition is the consequence of a previous condition, and this ever points to a series of earlier conditions; so that we need only a single key to penetrate from the last secret to the first. This key, however, is not yet found to the slightest things, and still less to the world of plants. […] Who would have imagined, two centuries ago, that in coal, wholly and entirely related to the mineral kingdom, lay buried nothing less than the remains of the immense vegetation of the antique world? (Unger, 1854 [1851], pp. 105–106)

Unger praised the different cellular building style of plants resembling the different architectural styles of Egyptians, Romans, Toltecs, and others. Four years after that, other Unger's publications, also translated into English language, the Lady Foote suggested that carbon dioxide might have been a better cause of those ancient higher temperatures than the water vapour (Unger, 1851 [1846], pp. 132–133, 145, 146; 1854 [1852], pp. 97–98, 105–106, 109–112, 114).

To promote Unger's ideas, Kuwasseg's coloured pictures of the Primeval World were shown to the greater public, who flocked in en masse. In 1859, they made rounds through Europe by oxyhydrogen flame limelight: the then new technology of lighting additionally attracted audiences by mixing prehistory and futurism. To fill in the gaps from the earliest prehistoric times, Unger added two new pictures in 1862. According to Kuwasseg, Unger also knew how to attract the official painter Joseph Selleny (Seleny, or Sellény; 1824–1875) Selleny joined the Novara expedition, which lasted from 30 April 1857 to 26 August 1859. By Unger's suggestion, Selleny painted two additional original images: 'Pre-Adamite Landscape' (a motif from the Greek island Euboea) and 'From the Stone Age.'

Unger's merits

Franz Unger did not use his aristocratic rank, except in his early publication in 1827 or 1833. His father had already acquired nobility by the end of the Napoleonic wars, as the local priest used the noble title "von" of Franz Unger's

father in a parish note about the funeral of Franz Unger's mother in 1815. Franz Unger's younger brother, the Knight Ferdinand Unger (1808 Gradišče (Schloßberg) no. 57 – 1871) never failed to promote his prestigious nobility. Ferdinand, who was a military surgeon, was head of the St. Florian Vaccination Regeneration Institute and greatly contributed to the vaccination system in Inner Austria. Therefore, the Unger brothers contributed to what became the two main problems of 2021–2022: the vaccinations and the global warming puzzles.

As a Darwinist researcher of cells and microscopic Brownian motion, Unger discovered climate change (Unger, 1832a, pp. 145–158, 163–175; 1832b, pp. 713–717). Unger was entirely of Slovenian descent on his mother's side, and spent his youth in a Slovenian environment. He could be characterised by his Slovenian family at least as much as his colleagues at the Viennese academy, the Slovenians Marian Koller and Josef Stefan. Of course, none of them published their technological and scientific findings in Slovenian language, since in those days there were no suitable journals, with the exception of the journal of the Yugoslav Academy of Sciences in Zagreb, printed under the name *Rad*. The Slovenian heritage may not have had such a noticeable influence on Unger in his later life and had little effect on his cosmopolitan work, which was certainly mainly related to the warming of the changeable atmosphere as part of the general Darwinian natural evolution. Movement, change, evolution, Darwinism, progress—all these marked Unger's era of the Brown movement, atomism, climate change, growing entropy. Some of those preferences were not always applauded in imperial Vienna, where the rulers preferred gradual developments and hated all revolutionary ideas developed during the Spring of Nations in 1848.

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